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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claim 11, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muthukrishnan et al. (US 6,377,544) in view of Sang et al (US 6,401,147), Asai (US 6,259,402), and Bechtolsheim et al (US 7,215,641).

For claim 11, Muthukrishnan discloses a method for routing packets (see col 4 line 47-60 “amount of flow is computed for each link....flow of the data is routed across each link”) in a distributed network (see Fig 1; 10,110 and col 4 lines 30-60 “communication system”) including a plurality of nodes (see Fig 1; 10,110 and col 4 line 35-50 “plurality of switches including a source and a sink”), the nodes (see Fig 1; 10,110 and col 4 lines 35-50 “plurality of switches including a source and a sink”) being coupled via links (see col 4 lines 35-50 “each of the switches connected to a neighboring switch by a....link”) and the nodes (see Fig 1; 10,110 and col 4 lines 35-60 “plurality of switches including a source and a sink”) having queues associated with the links (see Fig 1; queue and col 4 lines 30-60 “links having a pair of queue buffers...queue buffer pairs”), the method comprising the steps of: injecting a packet flow (col 4 lines 30-60 “flow is added at a source”), into the distributed network (see Fig 1; 10,110 and col 4 lines 30-60 “communication system”) at a corresponding source node (col 4 lines 30-60 “flow is added at a source”); equalizing the queues (see col 4 lines 35-60 “the flow is partitioned evenly among the queue buffers of the communication links of each switch....difference between the amount of data in each of the queue buffer pairs” and see col 5 lines 1-30 “amount of flow F_i isis routed across each said link suchis maximized” and col 4 lines 58-67 “is defined as the difference in a amount of data between a pair of queue

buffers” and col 6 amount of data that is in queue 20a....minus the amount of data that is
 in queue 120” and Fig 1; 20a, 120” and col 9 lines 5-25 "larger sending queue of the
 system transmits to the smaller receiving queue") each node (see col 4 lines 35-60 “the
 flow is partitioned evenly among the queue buffers of the communication links of each
 switch....difference between the amount of data in each of the queue buffer pairs” and
 see col 5 lines 1-30 ”amount of flow F_i osis routed across each said link suchis
 maximized” and col 4 lines 58-67 “is defined as the difference in a amount of data
 between a pair of queue buffers” and col 6 amount of data that is in queue 20a....minus
 the amount of data that is in queue 120” and Fig 1; 20a, 120” and col 9 lines 5-25 "larger
 sending queue of the system transmits to the smaller receiving queue" and col 7 lines 24-
 35 “repeated iteratively at each switch...each iteration at each switch”) of the distributed
 network (see Fig 1; 10,110 and col 4 lines 30-60 “communication system”), wherein an
 integer number of packets in each queue is maintained (see Fig 1; queue and col 4 lines
 30-60 “links having a pair of queue buffers...queue buffer pairs” and col 6 lines 35-50 “d
 units...divided equally among the local queue buffers of the switches” and col 8 lines 5-
 20 “ d_i units...each switch...difference...amount of data type” and col 8 lines 35-45 “ f_i
 units...communicant link e”);

; pushing the packet flow (see col 4 lines 35-60 “amount of the flow of the data is routed
 across each link”) in the distributed network (see Fig 1; 10,110 and col 4 lines 30-60
 “communication system”) such that packets are moved from a queue with a higher height
 to a queue with a lower height (see col 4 lines 35-60 “the flow is partitioned evenly
 among the queue buffers of the communication links of each switch....difference

between the amount of data in each of the queue buffer pairs” and see col 5 lines 1-30
”amount of flow F_i isis routed across each said link suchis maximized” and col 4
lines 58-67 “is defined as the difference in a amount of data between a pair of queue
buffers” and col 6 amount of data that is in queue 20a....minus the amount of data that is
in queue 120” and Fig 1; 20a, 120” and col 9 lines 5-25 “larger sending queue of the
system transmits to the smaller receiving queue”) in a manner that substantially
minimizes processing operations/load (see col 7 lines 40-56 “more than 8000
iterations.....method employedembodiment....performing 1500 iterations”) at affected
nodes (col 7 lines 24-35 “repeated iteratively at each switch...each iteration at each
switch”) ; and absorbing the packet flow (see col 4 lines 50-55 “routed data is then
removed when it reaches a sink or a destination node”) at a corresponding sink node (see
col 4 lines 50-55 “routed data is then removed when it reaches a sink or a destination
node”)

For claim 14, Muthukrishnan discloses packets are routed (see col 4 lines 35-60 “amount
of the flow of the data is routed across each link”, col 4 lines 35-60 “the flow is
partitioned evenly among the queue buffers of the communication links of each
switch....difference between the amount of data in each of the queue buffer pairs” and
see col 5 lines 1-30 ”amount of flow F_i isis routed across each said link suchis
maximized” and col 4 lines 58-67 “is defined as the difference in a amount of data
between a pair of queue buffers” and col 6 amount of data that is in queue 20a....minus
the amount of data that is in queue 120” and Fig 1; 20a, 120” and col 9 lines 5-25 “larger
sending queue of the system transmits to the smaller receiving queue”) for one or more

packets stored in the queues (see Fig 1; queue and col 4 lines 30-60 “links having a pair of queue buffers...queue buffer pairs....data....queue buffer pairs” and col 2 line 65 through col 3 line 5 “packet-routing...route data”) at least one of to and from the node in rounds (see col 4 lines 35-60 “amount of the flow of the data is routed across each link”, col 4 lines 35-60 “the flow is partitioned evenly among the queue buffers of the communication links of each switch....difference between the amount of data in each of the queue buffer pairs” and see col 5 lines 1-30 “amount of flow F_i osis routed across each said link suchis maximized” and col 4 lines 58-67 “is defined as the difference in a amount of data between a pair of queue buffers” and col 6 amount of data that is in queue 20a....minus the amount of data that is in queue 120” and Fig 1; 20a, 120” and col 9 lines 5-25 “larger sending queue of the system transmits to the smaller receiving queue” and col 3 lines 55-62 “proceeds in rounds”) for one or more packets stored in the queues (see Fig 1; queue and col 4 lines 30-60 “links having a pair of queue buffers...queue buffer pairs....data....queue buffer pairs” and col 2 line 65 through col 3 line 5 “packet-routing...route data”) such that throughput requirements are substantially satisfied (see col 7 lines 27-35 “satisfactory maximum flow value is reaches”), maximizing a processing constraint (see col 7 lines 40-56 “more than 8000 iterations.....method employedembodiment....performing 1500 iterations”; less calculation are made at each node) associated with the distributed network (col 7 lines 24-35 “repeated iteratively at each switch...each iteration at each switch” and Fig 1; 10,110 and col 4 lines 30-60 “communication system”).

Muthukrishnan is silent about:

For claim 11, wherein the packet flow is stored in an overflow buffer of the source node in response to a height of at least a given queue of the source node exceeding a threshold; that minimizing processing operations/load minimizes power dissipation and that heights of queues at the sink node are set to zero.

Sang from the same field of endeavor discloses a communication system with the following features:

For claim 11, Sang discloses wherein the packet flow is stored in an overflow buffer of the source node in response to a height of at least a given queue of the source node exceeding a threshold (see col 20 lines 3-25 “transferring entries to an overflow storage area if...exceeds the first threshold value...exceeds the second threshold value” and fig 7 ; S710-S720 or fig 8; S810-S822).

Asai from the same or similar field of endeavor discloses a communication system with the following features:

For claim 11, Asai discloses that minimizing processing operations/load (see col 3 lines 25-40 “suspends the operation relating...value calculation in the ...calculation portion”) minimizes power dissipation (see col 3 lines 30-40 “power consumption in the...calculation portion can be reduced”).

Bechtolsheim from the same or similar field of endeavor discloses a communication system with the following features:

For claim 11, Bechtolsheim discloses absorbing the packet flow at a corresponding sink node (see fig 3; 300, 330, 302-340 and fig 4; 460, "Yes" and 410-470) that heights of

queues at a sink node are set to zero (see fig 4; 460, "Yes" and 410-470 and col 12 lines 12-25 "stored buffer field...zero...no more packet from the flow remain in a queue)

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Muthukrishnan by using the features, as taught by Asai (US 6,259,402) and Bechtolsheim (7,215,641), in order to provide "queue structure and a method of queuing that will satisfy both competing interests of low latency and high capacity, that queues entries to a system with low latency, yet still retains the capacity to handle relatively large amounts of entries when necessary" (see Sang col 2); in order to provide a device with low power consumption (see Asai column 3); in order to provide "a scheme to rapidly identify good flows from bad (i.e., the well-behaved flows vs. the non-adapting aggressive flows) on a packet-by-packet basis. Furthermore, a flexible, low-overhead, extremely fast dynamic buffer limiting method and apparatus to fairly buffer and enqueue the wide variety of good flows and NAFs found in today's networks is also needed" (see Bechtolsheim col 3-4)

Additionally, as regarding Sang one of ordinary skill in the art could have combined the features mapped above and the features would have performed the same function as they did separately. A person of ordinary skill would have recognized that the results of the combination would have been predictable. Lastly as regarding Sang, Sang discloses a similar device as Muthukrishnan which was improved using the above mapped features. A person of ordinary skill in the art could have applied this known "improvement" features into the system of Muthukrishnan and the results would have been predictable to one of ordinary skill in the art.

As regarding to the Asai combination, in Muthukrishnan it was known the method lessens the number of iterations / processing cycles (see col 7 lines 35-56) and Asai shows that less processing results in less power consumption. Thus a person of ordinary skill in the art could have substituted this feature and the results of the substitution would have been predictable to a person of ordinary skill in the art.

Lastly, as regarding Bechtolsheim one of ordinary skill in the art could have combined the features as mapped above and the elements/features would have performed the same function as they did separately. One of ordinary skill in the art would have recognized that the combination of Muthukrishnan and the feature of Bechtolsheim would be predictable.

2. Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Muthukrishnan et al. (US 6,377,544) in view of Asai (US 6,259,402), Sang et al (US 6,401,147) and Bechtolsheim et al (US 7,215,641) as applied to claim 11 above, and further in view of Wang et al. (US 2006/0215593)

For claim 12, Muthukrishnan et al. (US 6,377,544), Sang et al (US 6,401,147), Asai (US 6,259,402) and Bechtolsheim et al (US 7,215,641) discloses the claimed invention as described in paragraph 7.

Muthukrishnan et al. (US 6,377,544), Sang et al (US 6,401,147), Asai (US 6,259,402), and Bechtolsheim et al (US 7,215,641) are silent about:

For claim 12, distributed network is a mobile ad-hoc network, and further wherein the node and at least one neighboring node communicate over a wireless link

Wang from the same or similar field of endeavor discloses a communication network with the following features:

For claim 12, Wang discloses distributed network is a mobile ad-hoc network (see Fig 3, 14), and further wherein the node (see fig 3, 44) and at least one neighboring node (see fig 42) communicate over a wireless link (see section 0035 "wireless node, wireless client")

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Muthukrishnan et al. (US 6,377,544) and Bechtolsheim et al (US 7,215,641), Sang et al (US 6,401,147), Asai (US 6,259,402) by using the features, as taught by Wang, in order to provide QoS and prevent collision (see section 0009-0014)

3. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muthukrishnan et al. (US 6,377,544) in view of Asai (US 6,259,402), Sang et al (US 6,401,147) and Bechtolsheim et al (US 7,215,641) as applied to claim 11 above, and further in view of Chuah (US 7,197,025)

For claim 13, Muthukrishnan et al. (US 6,377,544), Sang et al (US 6,401,147), Bechtolsheim et al (US 7,215,641), Asai (US 6,259,402) discloses the claimed invention as described in paragraph 7.

Muthukrishnan et al. (US 6,377,544), Sang et al (US 6,401,147), Bechtolsheim et al (US 7,215,641), Asai (US 6,259,402) are silent about:

For claim 13, node receiving broadcast information from at least one neighboring node pertaining to the height of at least one queue of one neighboring node.

Chuah from the same or similar field of endeavor discloses a communication network with the following features:

For claim 13, Chuah discloses node (see col 36 lines 14-60 "wireless modem") receiving broadcast information (see col 36 lines 14-60 "flow control signal...is sent....sets the Xon bit in the frame control field at the time it sends the next broadcast frame to all associated wireless modems") from at least one neighboring node (see col 36 lines 14-30 "access point") pertaining to the height of at least one queue (see col 36 lines 14-60 "buffer occupancy.... flow control signal...is sent....sets the Xon bit in the frame control field at the time it sends the next broadcast frame to all associated wireless modems") of one neighboring node (see col 36 lines 14-20 "access point") .

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Muthukrishnan et al. (US 6,377,544) and Bechtolsheim et al (US 7,215,641), Sang et al (US 6,401,147), Asai (US 6,259,402) by using the features, as taught by Chuah, in order to provide a method of efficiently control the timing and making of access requests by remote hosts (see cols 5-6).

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENAN CEHIC whose telephone number is (571)270-3120. The examiner can normally be reached on Monday through Friday 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KWANG BIN YAO can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kenan Cehic/
Examiner, Art Unit 2616

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